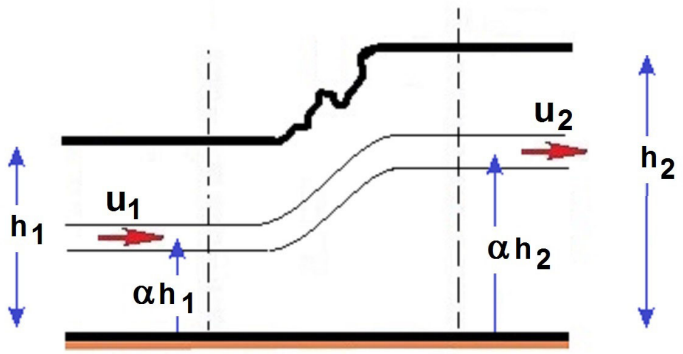
Solution to Problem 450C:



In the text we evaluated the total pressure drop, Δp^T, through a hydraulic jump for **any streamtube**:

$$\Delta p^T = \frac{\rho g(h_2 - h_1)^3}{4h_1 h_2} \tag{1}$$

where h_1 and h_2 are the water depths upstream and downstream of the jump. It follows that the rate of energy dissipation in the jump, E, is

$$E = Qb\frac{\rho g(h_2 - h_1)^3}{4h_1 h_2} \tag{2}$$

where b is the breadth of the flow and Q is the volume flow rate. In addition Q is given by

$$Q = \sqrt{gh_1h_2(h_1 + h_2)/2} = 12.13\ m^3/s \tag{3}$$

Therefore the answer is

$$E = 5700000\ kg\ m^2/s^3 = 7640HP \tag{4}$$